



STATE & PRIVATE FORESTRY FOREST HEALTH PROTECTION SOUTH SIERRA SHARED SERVICE AREA



Report No. SS22-03

**August 1, 2022
File Code: 3400**

To: Cicely Muldoon, Park Superintendent, Yosemite National Park
Brent Johnson, IPM Program Manager, PW Region, National Park Service

From: State and Private Forestry, Forest Health Protection, South Sierra Shared Service Area

Subject: SPLAT®Verb Treatments to protect High-value Sugar Pines

Introduction

California continues to enter another period of severe and prolonged drought, on the heels of an unprecedented event that only official ended five years ago. Tree mortality due to bark beetles is expected this summer as temperature and low annual precipitation reach historical records. The resulting dead trees create dangerous falling hazards in forests, roadways, and recreation, administrative sites as well as to park personnel, fire fighters, and general public. This report covers observations of current sugar pine mortality in the Park, and discussion of management recommendations and program effectiveness.

Observations and Survey

Yosemite and Sequoia-Kings Canyon National Parks have been experiencing above-normal sugar pine mortality, particularly in the past decade. Tree mortality is primarily associated with a native bark beetle mass attacking pines with reduced vigor and defenses due to stress or injury. Sugar pines are also highly susceptible to injury from other disturbances (ex: breakage due to wind or snow, white pine blister rust infection) that could incite subsequent bark beetle attack.

Sugar pines are particularly sensitive when drought conditions occur, and losses of legacy-sized sugar pines continue to be very high in the southern Sierra Nevada as detected by ground and aerial surveys (Forest Health Monitoring 2015-2021). Stephenson et al. 2019 in assessing mortality that occurred during the 2012-2016 California drought event, determined that sugar pines in the 20-50 cm and 50+ cm DBH (diameter-at-breast height) ranges accounted for the highest percentage of

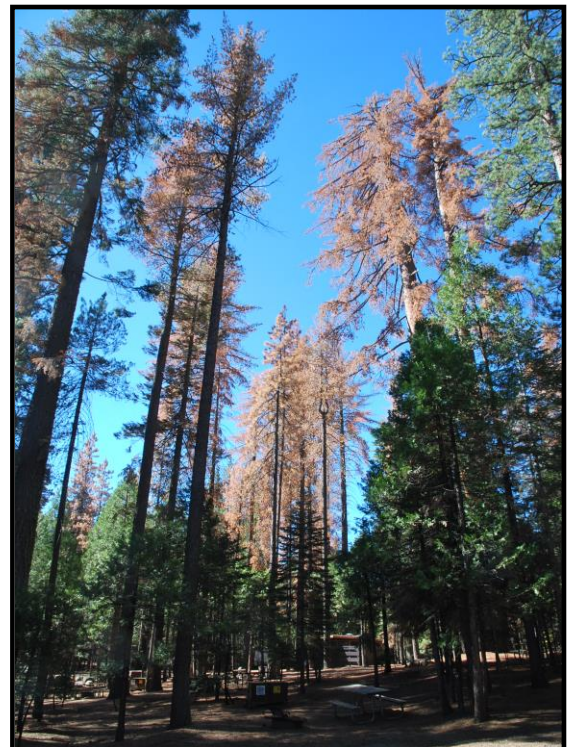


Image 1. Sugar pine killed by Mountain pine beetle in Hodgdon Campground 2015.

losses for that species in Sequoia-Kings Canyon National Park. Mortality in Yosemite National Park has been very similar with large groups having died in Hodgdon campground, Mariposa Grove, and along highway 120 (see Image 1).

Dicussion

There have been new developments in individual tree protection that are found to be effective, minimal in costs, and easily applicable. SPLAT®Verb is composed of synthetic ingredients that mimic natural bark beetle anti-aggregation pheromones that repel incoming beetles to find new hosts. SPLAT®Verb is particularly targeted towards mountain pine beetle (*Dendroctonus ponderosae*) which is the primary damage agent causing mortality. SPLAT®Verb is applied at a rate of 70 grams/tree (17.5 grams at four evenly spaced points on the bole, at least 6 feet up from the base) to sugar pines greater than 30 inches DBH. Fettig et al. 2016 found that SPLAT®Verb applied in spring before beetle flight can significantly reduce beetle attack. Repeated application is necessary as treatment is only effective for one year.

Forest Health Protection has been working with Park Forester (Pegg Julson) and other park personnel in management strategies to identify damage and protect high value trees in the most frequently visited locations (ex: campgrounds, groves) since 2015. SPLAT®Verb has been applied according to label specifications for the past seven years, and found to be highly effective in protecting trees every year of application. In spring of 2021 and 2022, 1271 and 1286 trees were treated, respectively for a total 970 acres. Merced, Mariposa, and Tuolumne Groves have been completed for 2022 (see Images 2 and 3). Additional trees were treated in Aspen Valley, Crane Flat Campground, and administrative sites near Hodgdon Meadow (see Image 4). Treatments conducted in Merced Grove after the 2018 Ferguson fire have proven highly effective in tree protection. The 2022 Washburn Fire footprint may need consideration for treatments of fire-injured sugar pines in 2023 once post-fire assessments can be conducted.

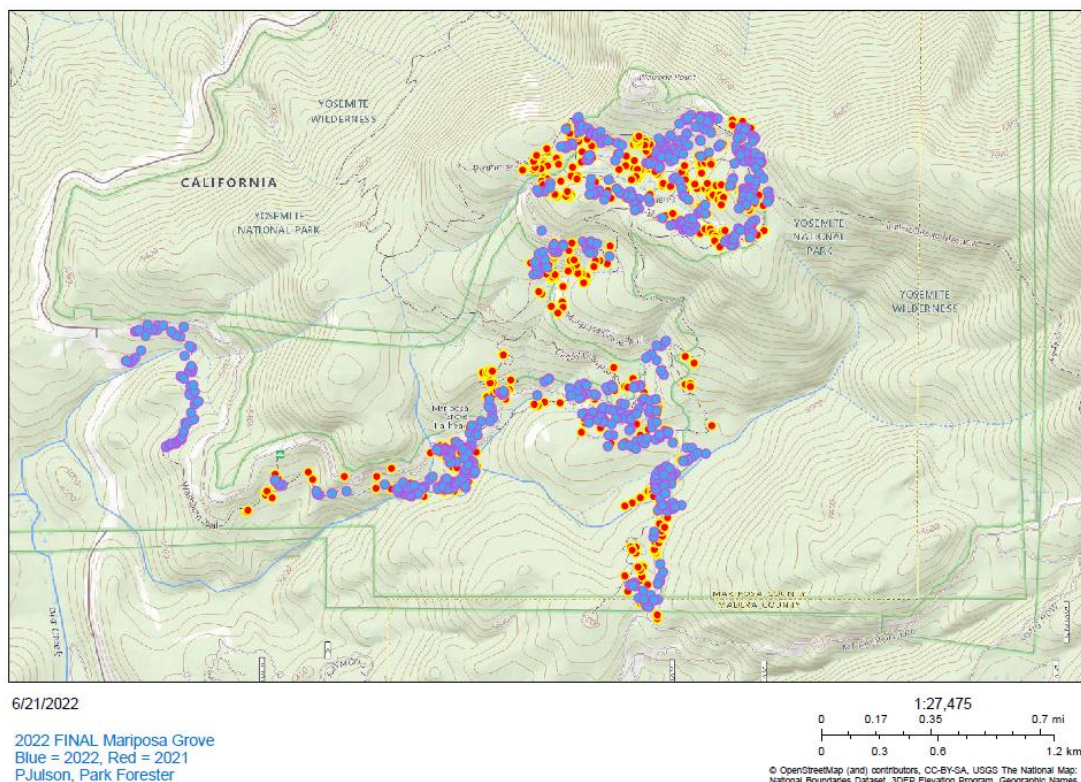


Image 2. Map of treated sugar pines in Mariposa Grove 2021 and 2022.

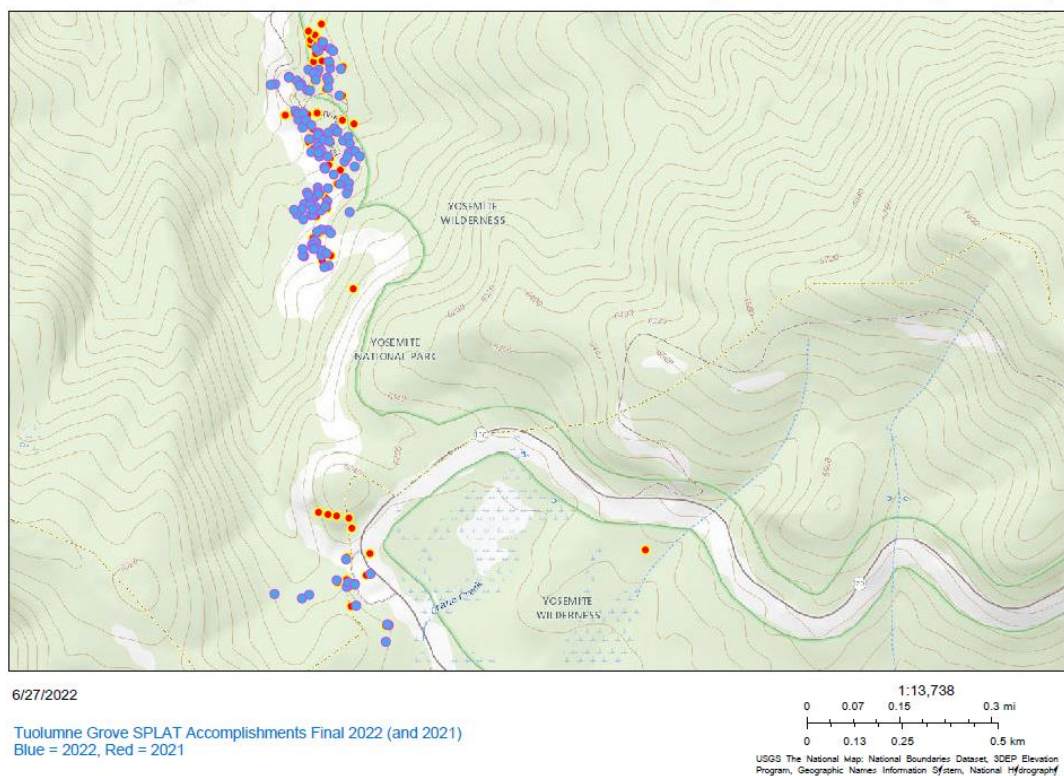


Image 3. Map of sugar pines treated in Tuolumne Grove 2021 and 2022.

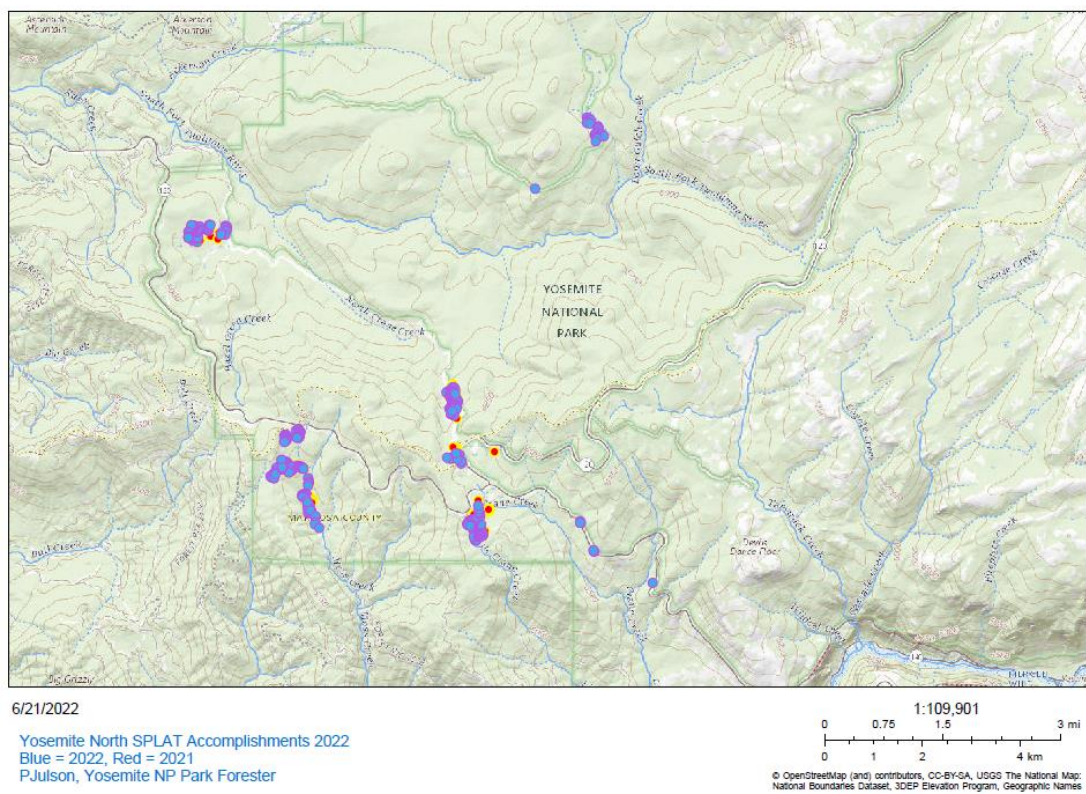


Image 4. Map of sugar pines treated in various locations in north Yosemite.

Forest Health Protection supports proactive treatments that provide temporary protection for high-value sugar pines in Yosemite National Park for 2023. Concurrent biomass and thinning projects in the Park greatly contribute to overall forest health and resilience. Please contact FHP at 209-768-5080 if you have any further questions or concerns.

Beverly Bulaon
Entomologist
(209) 288-6347

beverly.bulaon@usda.gov



Image 2. Sugar Pine with drooping branches from weight of cones
Photo: Wikipedia Commons public domain

cc: Pegg O’Laughlin Julson, Yosemite National Park, Park Forester

References.

Fettig, C.J., B. Steed, B. Bulaon, L.A. Mortenson, R. Progar, C.A. Bradley, A.S. Munson, and A. Mafra-neto 2016. *Efficacy of SPLAT® Verb for protecting individual Pinus contorta, Pinus ponderosa, and Pinus lambertiana from mortality attributed to Dendroctonus ponderosae.* Journal of Entomological Society of British Columbia 113: 11-20.

Stephenson, N., A.J. Das, N.J. Ampersee, B.M. Bulaon, and J.L. Yee 2019. *Which trees die during drought? The key role of insect host tree selection.* Journal of Ecology 107: 2383–2401.